it requires less mobile patrons to travel less. It causes more mobile patrons to travel further, thereby increasing their costs.

2. Minimize distance per capita:

This favors increased use by present non-users, especially those living in densely populated areas. It causes inequities for users living in more sparsely populated areas.

3. Minimize distance per visit:

This favors areas with present high demand and decreases use in immobile areas.

4. Minimize present degradation in utilization:

This predicts larger areas of coverage for more mobile districts.

A model such as this may prove of particular use in the location of a new branch in an unserved area. As Savas (1978, p. 806) points out:

...equity is a matter of values.... To announce the unambiguous adoption of one principle is to invite united opposition from those who favor the other principles. In any real public service, one of the allocation formulas may be used implicitly, but even if a "pure" formula is employed at the outset...the formula will soon be modified and will reflect the influence of the other principles as weil....He (the management scientist) must recognize at the outset that competing values lie in the heart of the matter—conflicting notions of what is equitable or fair and what is not. And he should appreciate, without feeling dismay or disdain, that political judgements will ultimately decide the particular, muddled, optimal (by definition) mixture of values that will temporarily prevail at any given moment in the provision of public services.

Hence, models which allow civic planners the opportunity of viewing the various options will assist in the implementation of a plan which serves the best long-run interests of the entire community.

## VI. CONCLUSION

The spacing of library branches within a system has important effects upon the overall viability of the library system. A superfluity of branches requires distribution of scarce resources (books, wages, maintenance) over too broad a base, resulting in inefficiency and poor public response. Inadequate provision of branches results in failure to serve portions of the population equally entitled to a share of this public good. Poor utilization of the library within a community, in turn, causes lessened public responsiveness to the library's needs, and hence, less funding in the future.

In an economic environment in which public support is vital, it behooves the library system to review carefully the options available through siting adjustments. An accurate analysis of the community with respect to its demographic composition, in conjunction with an application of plan-

ning models suited to the siting problems of the library system, can combine to assist administrators in allocating their resources in the most service- and cost-effective means. Particular attention should be paid in such analyses to the problems of areas with low mobility or high concentrations of either younger or older citizens, communities characterized by light to moderate library use patterns, and areas serving as shopping districts or places of employment for otherwise unserved patrons. Effective location of branches in such areas may increase use by the immediate community without seriously affecting the use of those with more intensive library requirements.

Ultimately, a library is more than a physical structure situated in a particular location. It is the combined personalities of its staff and the collections of materials offered on shelves. The image a library projects, its attractiveness to the members of its community, is of major importance to the viability of the institution. Careful matching of the site and the community it represents can provide more effective service within the resources available to the institution.

## VII. REFERENCES

Abernathy, W. J., and Hershey, J. C. (1972). A spatial-allocation model for regional-health services planning. Operational Research 20, 629-642.

Ahlstrom, P. (1968). Survey of patron mobility in Idaho Falis. Idaho Librarian 20, 13-14.
 American Library Association. (1927). "A Survey of Libraries in the United States, 1926-.927.
 Vol. III. Public Library Service to Children, Extension Work and Community Service of Public Libraries, School Library Organization and Service." American Library Association, Chicago, Illinois.

American Library Association, Committee on Post-War Planning. (1943). "Post-War Standards for Public Libraries." American Library Association, Chicago, Illinois.

Arthur D. Little, Inc., and John S. Bolles, Associates. (1970). "The Urban Central Library: Development Alternatives for San Francisco." Arthur D. Little, San Francisco, California.

Bach, L. (1980). Locational models for systems of private and public facilities based on concepts of accessibility and access opportunity. Environment and Planning A 12, 301-320

Barton, J. R., and Rector, F. E. (1951). "The Public Library in Wisconsin: An Inquiry into its Social and Educational Resources." University of Wisconsin, Department of Sociology in cooperation with the Wisconsin Free Library Commission, Madison, Wisconsin.

Beckmann, M. J. (1968), "Location Theory." Random House, New York.

Benjamin, A. S. (1974). "The Relationship Between Selected Personal Factors and Knowledge of the Public Library of Selected Adults in Ventura County, California." Masters Thesis, University of Southern California (ED 090 943.)

Bennett, W. D., and Smith, B. D. (1975). The correlates of library patronage distance decay.

The East Lakes Geographer 10, 33-44.

Berelson, B. (1949). "The Library's Public: A Report of the Public Library Inquiry." Columbia University Press, New York.

Bertram, G. B. (1963). Bibliography in progress: Public library location. New Zealand Libraries 26, 296-304.

Bonser, C. F., and Wentworth, J. R. (1970). "A Study of Adult Information Needs in Indiana I Information Indiana (FD 044-133).

SENT BIT

- Brookes, B. C. (1970). The viability of branch libraries. Journal of Librarianship 2, 14-21.
- Brown, E. F. (1970). "Modern Branch Libraries and Libraries in Systems." Scarecrow Press, Metuchen, New Jersey.
- Buckland, M. K. (1978). Ten years progress in quantitative research on libraries. Socio-Economic Planning Sciences, 12, 333-339.
- Bundy, M. L. (1967). Metropolitan public library use. Wilson Library Bulletin 41, 950-961.
- Bundy, M. L. (1968). "Metropolitan Public Library Users: A Report of a Survey of Adult Library Use in the Maryland Baltimore-Washington Metropolitan Area," University of Maryland, School of Library and Information Services, College Park, Maryland.
- Campbell, A., and Metzner, C. A. (1952). "Public Use of the Library and Other Sources of Information." Institute for Social Research, University of Michigan, Ann Arbor, Michigan.
- Carroll, J. M. (1966). Establishing branch libraries. Library Trends 14, 385-400.
- Chandler, H. B., and Croteau, J. T. (1940). "A Regional Library and its Readers." American Association for Adult Education, New York.
- Chicago Public Library. (1916). "A Library Plan for the Whole City: Proposed System of Regional and Auxiliary Branches." Chicago Public Library, Chicago, Illinois.
- Christalier, W. (1966). "Central Places in Southern Germany." (Translated from "Die Zentralen Orte in Süddeutschland." by C. W. Baskin). Prentice-Hall, Englewood Cliffs, New Jersey.
- Cliff, A. D., and Ord, J. K. (1975). Model building and the analysis of spatial pattern in human geography. Journal of the Royal Statistical Society, Series B 37, 297-328.
- Cochrane, J. (1970). The Haringey Library study. Greater London Council. Research and Intelligence Unit. Quarterly Bulletin 10 (March), 35-47.
- Cohen, S. H. (1973). "Spatial Patterns and Neighborhood Awareness: A Study in Geographic Perception." Unpublished dissertation, University of Denver.
- Colorado Market Research Services, Inc. (1974). "A Survey of the Attitudes, Opinions and Behavior of Citizens of Colorado with Regard to Library Services." Vol. 4. Geographic Summary, Colorado Market Research Services, Denver, Colorado.
- Community Studies, Inc. (1952). "A Study of Branch Library Location and Service." Community Studies, Kansas City, Missouri.
- Consad Research Corporation. (1968). "Baltimore Metropolitan Area Library Study: Short Range Work Program: Tasks, Schedule and Methods." Consad Research Corporation, Pittsburgh, Pennsylvania (ED 027 045.).
- Coughlin, R. E., Taïeb, F., and Stevens, B. H. (1972). "Urban Analysis for Branch Library System Planning." Greenwood Press, Westpott, Connecticut. (Contributions in Librarianship and Information Science, No. 1.)
- Cowing, T. G., and Holtmann, A. G. (1976). "The Economics of Local Public Service Consolidation." Lexington Books, Lexington, Massachusetts.
- Cushman, I., and Hayes, R. M. (1968). "Analysis of Usage of the Central Library of the Los Angeles Public Library." Institute of Library Research, University of California, Los Angeles, Los Angeles, California. ("A Survey of the Users of the Los Angeles Central Library" Series).
- Cuyahoga County, Ohio, Regional Planning Commission, (1966). "Changing Patterns: A Branch Library Plan for the Cleveland Metropolitan Area: A Report to the Cleveland Public Library and Cuyahoga County District Library." Cuyahoga County Regional Planning Commission, Cleveland, Ohio.
- D'Elia, G. (1980). The development and testing of a conceptual model of public library user behavior. Library Quarterly 50, 410-430.
- Dökmed, V. F. (1979). A multiobjective model for regional planning of health facilities. Environment and Planning A 11, 517-525.

- Doms, K. (1967). Needed: A fuller knowledge of the user and the non-user. Wilson Libra Bulletin 41, 931-932.
- Dunstan, W. (1977). How and why the urban public library usually ends up in the wrong plac Australian Library Journal 26, 265-269.
- Eastman, L. A. (1911). "Branch Libraries and Other Distributing Agencies." (Preprint of the Manual of Library Economy, Chapter 15). American Library Association, Chicago, I finots.
- Elkin, N. (1972). The vantage point of an urban planner. In "The Metropolitan Library (R. W. Conant and K. Molz, eds.), pp. 224-230. MIT Press, Cambridge, Massachusett
- Elrick and Lavidge, Inc. (1977). "Public Library Usage in Illinois." Illinois State University Springfield, Illinois. (Illinois State Library Report No. 1.)
- Elton, M., and Vickery, B. (1973). The scope for operational research in the library and information field. Aslib Proceedings 25, 305-319.
- Enser, A. G. S. (1950). "Branch Library Practice." Grafton and Company, London.
- Evans, C. (1970). "Middle Class Attitudes and Public Library Use." Libraries Unimited Littleton, Colorado.
- Evans, C. (1976). A history of community analysis in American librarianship. Library Trend 24, 441-457.
- Evans, G. E. (1979). "Developing Library Collections." Libraries Unlimited, Littleton Colorado.
- Fouché, B. (1970). Veranderende openbare biblioteek-besoekpatrone (In Afrikaans) Soul-African Libraries 38, 18-25.
- Frana, A. (1976). Optimale standorte. (In German) Bibliothekar 30, 171-173.
- Francis, J. P. E. (1968). Antrim County Library partial readership survey 1966. Research in Librarianship 2, 64-66.
- Freestone, R. (1976). Public library location literature: A selected b bliography. Minneson Libraries 25, 82-88
- Freestone, R. (1977), "Public Facility Location." Council of Planning Librarians, Monteello Illinois, (Council of Planning Librarians Exchange Bibliography No. 1221.)
- Freestone, R. (1978). The geography of urban public library development. Minnesote Librarie 25, 299-310.
- Gallup International, Inc., and New Jersey State Library. (1976). "The Use of and Attitude Toward Libraries in New Jersey. Vols. 1 and 2." U.S. Office of Education Washington, D.C. (ED 124-164, 124-165.)
- Gallup Organization, Inc. (1976). "The Role of Libraries in America." Kentucky Department of Library and Archives, Frankfort, Kentucky.
- Galvin, H., ed. (1976). A public library site symposium. In "Library Journal Spec at Repor No. 1: Library Space Planning." (K. Nyren, ed.), pp. 15-29. Library Journal, New York
- Getz, M. (1980). "Public Libraries: An Economic View." John Hopkins University Press Baltimore, Maryland.
- Goodenough, F. L. (1926). Factors conditioning municipal library circulation. School and Society 24, 54-56.
- Oray, W. S., and Monroe, R. (1929). "Reading Interests and Habits of Adults," Macmillan New York.
- Greenenough, W. W. (1871). "Address Delivered at the Dedication of the East Boston Branc' of the Public Library." Mudge and Son, Boston, Massachusetts.
- Orundt, I., (1968). "Efficient Patterns of Adequate Library Service in a Large City: A Sorver of Boston." University of Illinois, Urbana-Champaign, Illinois.
- Haas, W. J. (1962). Student use of New York's libraries. Library Trends 15, 529-540.

- Haggett, P., Cliff, A. D., and Frey, A. (1977). "Locational Analysis in Human Geography." Arnold, London.
- Hamburg, M., Clelland, R. C., Bornmer, M. R. W., Ramist, L. E., and Whitfield, R. M. (1974). "Library Planning and Decision Making Systems." MIT Press, Cambridge, Massachuserts.
- Handfield, C., and Hamilton-Smith, E. (1975). "Libraries and People in Meibourne." Library Council of Victoria, Melbourne, Australia.
- Hart, E. D., and Palmer, H. C. (1966). "The Public Libraries of San Bernandino County: A Study with Recommendations." (s.p., s.1.)
- Hayes, R. M. (1979). "Evaluation of the Los Angeles Public Library: A Survey of the Users and of the General Public." Unpublished manuscript.
- Hayes, R. M. (1980). Unpublished report.
- Haynes, R. M. (1974). Application of exponential distance decay to human and animal activities. Geografiska Annales B 56, 90-104.
- Healy, S., La Sala, J., McIntyre, B., and Stayner, R. (1980). "Report on a Study of the Delivery of Library Services by Caulfield-Malvern Regional Library Service." Caulfield-Malvern Regional Library Service, Caulfield, Australia.
- Hodgart, R. L. (1978). Optimizing access to public services: A review of problems, models and methods of locating central facilities. Progress in Human Geography 2, 17-48.
- Hodgson, J. G. (1946). "Rural Reading Matter as Provided by Land-Grant Colleges and Libraries." Unpublished dissertation, University of Chicago.
- Hodgson, M. J. (1978). Toward more realistic allocation in location allocation models: An interaction approach. Environment and Planning A 10, 1273-1285.
- Horowitz, A. B. (1933). Effect of distance on frequency of use of public facilities. City Planning 9, 135-137.
- Hubbard, R. (1978). A review of selected factors conditioning consumer travel behavior.

  Journal of Consumer Research 5, 1-21.
- Huff, D. L. (1962). "Determination of Intra-urban Retail Trade Areas." University of California, Real Estate Research Program, Los Angeles, California.
- Institute of Urban Life. (1969). "Natural Library Service Zones: A Report to the North Suburban Library System." Institute of Urban Life, Chicago, Illinois. (ED 026108.)
- Joeckel, C. B., and Carnovsky, L. (1940). "A Metropolitan Library in Action: A Survey of the Chicago Public Library." University of Chicago Press, Chicago, Illinois.
- Joeckel, C. B., and Winslow, A. (1948). "A National Plan for Public Library Service." American Library Association, Chicage, Illinois.
- Johnstone, J. C., Meyer, L. J., Nobles, J. E., Pahl, E., Rasmussen, B., and Rettig, T. D. (1977). "La Biblioteca Latino Americana" User Survey." San Jose State University, San Jose, California. (San Jose Public Library Studies in Librarianship, No. 2.)
- Jones, F. M. (1926). "Library Service for 'Greater Wilmington': A Report on the Present Service and Future Expansion of the Wilmington Institute Free Library." Wilmington Institute Free Library, Wilmington, Delaware.
- Kantor, P. B. (1979). A review of library operations research. Library Research 1, 295-345. Knight, D. M., and Nourse, E. S., eds. (1969). "Libraries at Large: Tradition, Innovation, and
  - the National Interest." Howker, New York.

    Chen, M. (1926). "Optimal Location." Paper presented at a Case Western Pagerna.
- Kochen, M. (1976). "Optimal Location." Paper presented at a Case Western Reserve University Seminar. (Cited in Kantor, P. B., Library Research 1, 327, 1979.)
- Krieg, L. (1939). Community studies in reading: IV. A middle-western manufacturing community. Library Quarterly 9, 72-86.
- Kronus, C. L. (1973). Patterns of adult library use: A regression and path analysis. Adult Education 23, 115-131.

- Lakshmanan, T. R., and Hansen, W. G. (1965). A retail market potential model. Journal of the American Institute of Planners 31, 134-143.
- Lea, A. C. (1979). Welfare theory, public goods and public facility location. Geographical Analysis 11, 217-239.
- Leigh, R. D. (1950). "The Public Library in the United States." Columbia University Press, New York.
- Ley, D. (1974). "The Black Inner City as Frontier Outpost: Images and Behavior of a Philadelphia Neighborhood." Association of American Geographers, Washington, D.C.
- Library Association (1952). "Public Library Buildings." Library Association, London.
- London. Borough of Greenwich, Programme Planning Section. (1974). "Library Services in Greenwich Objectives and Effectiveness, Key Issue Report." London Borough of Greenwich Programme Planning Section, London.
- Los Angeles, Bureau of Budget and Efficiency. (1949). "Organization, Administration and Management of the Los Angeles Public Library. Vol 6. Extension Service Requirements." City of Los Angeles, Bureau of Budget and Efficiency, Los Angeles. California.
- Lowrey, R. A. (1969), "Notes on the Analysis of Urban Space" Unpublished dissertation, John Hopkins University.
- Luckham, B. L. G. (1969). Five years on: The effect of new services, extended registration tickets and other factors on public library membership in Southampton, 1963-1968. Research in Librarianship 2, 157-163.
- Luckham, B. L. G. (1973). "Libraries and Adult Education Studies: No. 1." Public Libraries and Adult Education Committee for the North West with the Department of Extramural Studies, University of Manchester, Manchester, England.
- McDiarmid, E. W. (1940). "The Library Survey: Problems and Methods." American I. brary Association. Chicago. Illinois.
- Martin, L. A. (1963). "Students and the Pratt Library: Challenge and Opportunity." Enoch Pratt Free Library, Baltimore, Maryland. (Deiches Fund Studies for Pub ic Library Service, No. 1.)
- Martin, L. A. (1967). "Baltimore Reaches Out: Library Service to the Disadvantaged." Enoch Pratt Free Library, Baltimore, Maryland. (Deiches Fund Studies of Public Library Service, No. 3.).
- Martin, L. A. (1969). "Library Response to Urban Change: A Study of the Chicago Public Library." American Library Association, Chicago, Illinois,
- Martin, L. A. (1979). Demographic trends and social structure. Library Trends 27, 269-298.
   Monat, W. R. (1967). "The Public Library and its Community: A Study of the Impact of Library Services in Five Pennsylvania Cities." Pennsylvania Institute of Public Administration, The Pennsylvania State University, University Park, Pennsylvania.
- Morrill, R. (1974). Efficiency and equity of optimum location models. Antipode 6, 41, 46. Mortimore, A. D., Hall, C. R., and Kelly, E. J. (1967). "Readers' Borrowing Habits in the Car Age: A Report on a Survey of Branch Libraries in England and Wales." Branch and Mobile Libraries Group of the Library Association, London.
- National Educational Resources Institute, Inc. (1972). "A Systems Analysis of Southwestern Spanish-Speaking Users and Nonusers of Library and Information Services Developing Criteria to Design an Optimal Model Concept. Final Report." National Education Resources Institute, Washington, D.C. (ED 066 173.)
- Nelson Associates, Inc. (1968). "Public Library Service in Lucas County, Ohio. An Evaluation with Recommendations." Nelson Associates, New York. (ED 025-292.)
- University of the State of New York, Division of Evaluation. (1967). "Emerging Library Systems; The 1963-66 Evaluation of the New York State Public Library System." University of the State of New York, Albany, New York.

- Nijkamp, P. (1976). The use of spatial impact models in physical planning. Geoforum 7, 67-79. Osborn, E. (1971). The location of public libraries in urban areas. Journal of Librarianship 3, 237-244.
- Parker, E. B., and Paisley, W. J. (1966). "Patterns of Adult Information Seeking." Stanford University, Institute for Communications Research, Palo Alto, California. (ED 010 294.)
- Peil, M. (1963). Library use by low-income Chicago families. Library Quarterly 13, 329-333.

  Pilcher, M. L. (1923). "Who's Who Among Readers in the St. Louis Public Library." St Louis

  Public Library, St. Louis. Missouri.
- Potviiet, J. (1928). The Lisbon Avenue branch and its territory. Wisconsin Library Bulletin 24, 97-98.
- Public Technology, Inc. (1974). "Library Location Project: Working Papers." Public Technology, Washington, D.C.
- Public Technology, Inc. (1978). "Ambulance Services Location Package: Project Operations Guide." Public Technology, Washington, D.C.
- Quinly, W. J. (1948). "A Patron Survey of the Kansas City, Kansas Public Library." Professional Project, University of Denver. (As quoted in Berelson, B., "The Library's Public," 1949.)
- Ramsay, M. (1958) "The Location of Branch Libraries in a County Library System." Masters Thesis, University of California, Berkeley.
- Reilly, W. J. (1931). "The Law of Retail Gravitation." W. J. Reilly, New York.
- Revelle, C., and Church, R. (1977). A spatial model for the location construct of Teitz.

  Rezional Science Association. Papers 39, 129-136.
- Roberts, R. G. (1966). Reilly's law: The law of retail gravitation. Library Association Record 68, 390-391.
- Robertson, I. M. L. (1972). Population distribution and location problems: An approach by grid squares in central Scotland. Regional Studies 6, 237-245.
- Robinson, W. C. (1976). "The Utility of Retail Site Selection for the Public Library." University of Illinois, Graduate School of Library Science, Urbana-Champaign, Illinois. (University of Illinois Graduate School of Library Science Occasional Paper No. 122.)
- Savas, E. S. (1978). On equity in providing public services. Management Science 24, 800-808.
  Schlipf, F. A. (1973). "The Geographical Distribution of Urban Public Library Use and Its Relationship to the Location of Branch Libraries.", Unpublished dissertation, University of Chicago.
- Schuler, E. A., and Turbeville, G. (1948). The relation of rural reading and library use to some ecological factors. *Library Quarterly* 18, 171-182.
- Shaughnessy, T. W. (1967). "Progress and Problems of Pennsylvania Libraries: A Re-Survey.

  Appendix." Pennsylvania State Library, Harrisburg, Pennsylvania.
- Shaughnessy, T. W. (1970). "The Influence of Distance and Travel-time on Central Library Use." Unpublished dissertation, Rutgers University.
- Sheppard, E. S. (1980). Location and the demand for travel. Geographical Analysis 12, 111-128. Smith, D. H. (1977). "Access to Information: An Assessment of the Library and Information Service Needs of the Senior Citizens of Virginia Beach." Virginia Beach Department of Public Libraries, Virginia Beach, Virginia.
- Smith, G. C. (1976). The spatial information fields of urban consumers. Transactions of the Institute of British Geographers, New Series. 1, 175-189.
- South, J. A. M. (1975). "Survey of Walk-in Use of the Pratt Central Library: A Study of Library Use in an Inner City Metropolitan Central Library Facility." Regional Planning Council, Baltimore, Maryland. (Technical Reports on Library and Information Services, VI.)

- Stanfel, L. E. (1979). Designing simple library hierarchies using linear programming. Information Processing and Management 15, 65-69.
- Stratton, P. J. (1976). "Public Libraries: Their Structure, Use, and Cost of Service Provision."

  Unpublished dissertation, Northern Illinois University.
- Taves, M. (1965). Variables related to library use. Minnesota Libraries 21, 158-166.
- Taylor, J. N., and Johnson, I. M. (1973). "Public Libraries and Their Use: A Research Report on the Use of Public Library Buildings with Implications for their Distribution, Location, and Design." HMSO Department of Education and Science, London. (Library Information Series, No. 4.)
- Teitz, M. B. (1967). "Toward a Theory of Urban Public Facility Location." Department of City and Regional Planning and Center for Planning and Development Research, Berkeley, California. (Institute of Urban and Regional Development, Working Paper No. 62.) (Also published in The Regional Science Association Papers. 21, 35-51.)
- Tri-County Regional Planning Commission (Medina-Summit-Portage), and Blasingame. R. (1972). "Survey of Public Libraries-Summit County." Tri-County Regional Planning Commission, Akron. Ohio.
- Uveling, R. A. (1939). Administration of branch systems. In "Current Issues in Library Administration: Papers Presented Before the Library Institute at the University of Chicago, August 1-12, 1938." (C. B. Joeckel, ed.), pp. 135-162. University of Chicago, Chicago, Illinois.
- Vance, M. (1960). "Public Library Site Selection." Council of Planning Librarians, Monticelio, Illinois. (Council of Planning Librarians Exchange Bibliography, No. 13.)
- Waples, D. (1932). The relation of subject interests to actual reading. Library Quarterly 2, 42-70.
- Warner, E. S., Murray, A. D., and Palmour, V. E. (1973). "Information Needs of Urban Residents: a Final Report from the Regional Planning Council of Baltimore and Westat, Inc., of Rockville, Maryland to the United States Department of Health, Education, and Welfare." Office of Education, Division of Library Programs, Washington, D.C. (Contract OEC-O-71-455.) (ED 088 464.)
- Wert, J. E. (1937). The effectiveness of the public-school-housed library branch. Library Ouarterly 7, 537-545.
- Wheeler, J. L. (1958). "The Effective Locations of Public Library Buildings." University of Illinois Graduate School of Library Science, Urbana-Champaign, Illinois, (University of Illinois Graduate School of Library Science Occasional Papers, No. 52.)
- Wheeler, J. L. (1967). "A Reconsideration of the Strategic Location for Public Library Buildings." University of Illinois Graduate School of Library Science, Urbana-Champaign, Illinois. (University of Illinois Graduate School of Library Science Occasional Papers. No. 85.)
- White, J. A., and Case, K. E. (1974) On covering problems and the central facilities location problem. Geographical Analysis 6, 281-293.
- Williams, R. V. (1980). Sources of the variability in level of public library development in the United States: A comparative analysis. Library Research 2, 157-176.
- Wilson, A. G. (1970), "Entropy in Urban and Regional Modelling." Pion, London. (Monographs in Spatial and Environmental Systems Analysis. No. 1.)
- Wilson, L. R. (1938). "The Geography of Reading: A Study of the Distribution and Status of Libraries in the United States," University of Chicago Press, Chicago, Illinois
- Wilson, R. A., and Figura, R. (1974). "The Library Listens-Delaware Library Association Survey, 1973." University of Delaware, Division of Urban Affairs, Newark, Delaware, (ED 093-344.)

- Woodsworth, A., Marsden, L. R., and Seligman, R. N. J. (1975). "Public Library Needs in the East End of Toronto." Information Consultants, Toronto, Omario.
- Yocum, J. C., and Stocker, F. D. (1970). "The Development of Franklin County Libraries, 1980." Ohio State University, College of Administrative Science, Center for Business and Economic Research, Columbus, Ohio.
- Young, R. (1973). An exploratory analysis of demand for the public library lending service.

  Applied Economics 5, 119-132.
- Zweizig, D. L. (1973). "Predicting Amount of Library Use: An Empirical Study of the Role of the Public Library in the Life of the Adult Public." Unpublished dissertation, Syracuse University.
- Zweizig, D. L. and Dervin, B. (1977). Public library use, users, uses: Advances in knowledge of the characteristics and needs of the adult clientele of American public libraries. Advances in Librarianship 7, 231-255.

idents
litterand
ap-